



El uso de machine learning para la investigación en asuntos públicos

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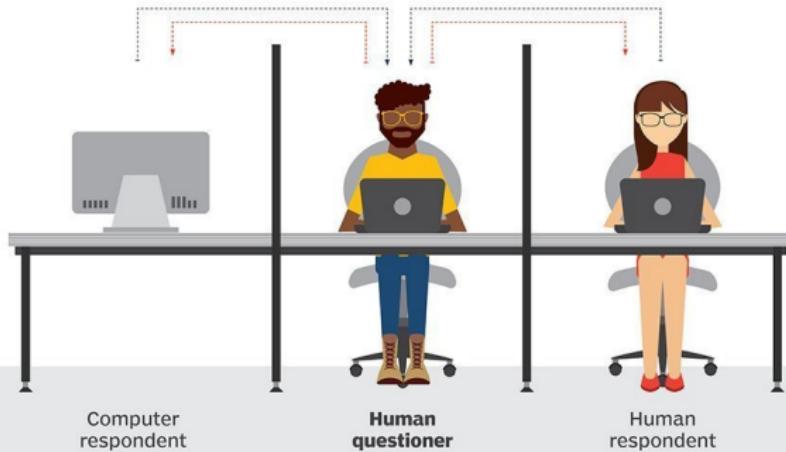
Inteligencia artificial y machine learning

Turing test

During the Turing test, the human questioner asks a series of questions to both respondents.

After the specified time, the questioner tries to decide which terminal is operated by the human respondent and which terminal is operated by the computer.

■ QUESTION TO RESPONDENTS ■ ANSWERS TO QUESTIONER



Se asocia la IA con la capacidad de crear programas que puedan realizar operaciones como los humanos, por ejemplo, razonamiento lógico y aprendizaje.

Para pasar el test de Turing sería necesario:

- Procesamiento de lenguaje natural (NLP)
- Almacenar información
- Razonamiento (econometría clásica) y aprendizaje automático (ML)
- Percepción del entorno y robótica (interactuar)

Aprendizaje automático

ML se puede considerar un subcampo de computer science que construye **algoritmos** para resolver un problema práctico básicamente usando reco-pilación de **big data** y la construcción de modelos a partir de esos datos.

- Requiere de cierta capacidad de procesamiento
- No necesariamente hay teoría para entender relaciones
- La inteligencia artificial puede aprender de relaciones subyacentes en big data

Aprendizaje supervisado para encontrar $Y = f(X)$: $(X_i, Y_i)_{i=1}^n$

Aprendizaje no supervisado (patrones): $(X_i)_{i=1}^n$

Procesamiento automático de información

Aunque actualmente existen técnicas para producir de forma automática datos sobre eventos en ciencia política y administración pública, mayoritariamente se continúa utilizando codificación manual.

La **codificación manual es costosa** en tiempo y recursos e impide garantizar la **reproducibilidad** del proceso ([Radford, 2019](#)).

Desde mediados de la década de 1990 los esfuerzos de codificación automatizada para elaborar conjuntos de datos de eventos y fenómenos de interés público han crecido. La mayoría de estos conjuntos de datos han sido construidos con fuentes abiertas de noticias y se han procesado con diccionarios pre-elaborados.

Reconocimiento óptico de información del servicio civil

Algoritmo OCR para servicio civil chileno

 Bastián González-Bustamante, Matías Astete y Berenice Orvenes

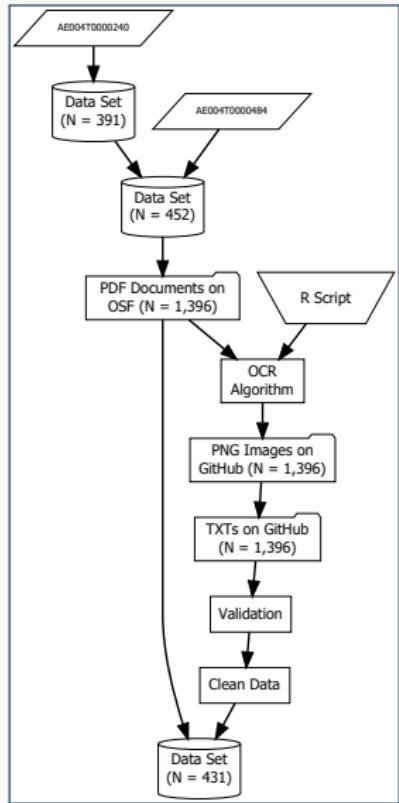
 DOI: [10.17605/OSF.IO/WBF6M](https://doi.org/10.17605/OSF.IO/WBF6M)

 training-datalab.com/projects/chilean-civil-service

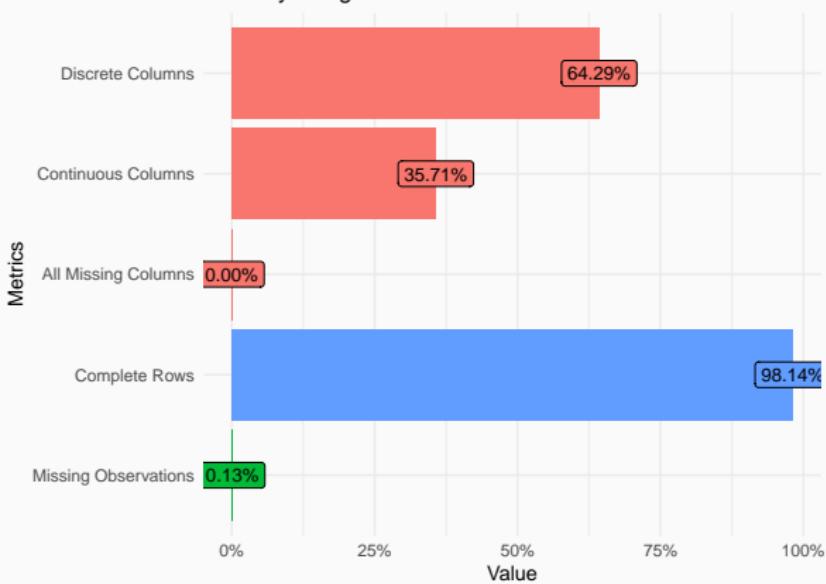
A Novel Dataset on Members of the Chilean Civil Service. Conjunto de datos con información detallada de 431 altos directivos públicos del primer nivel jerárquico del servicio civil chileno (2009-2017). Fue creado con dos solicitudes de acceso a información pública realizadas a la DNSC y una revisión de 1.396 documentos públicos, principalmente decretos y noticias institucionales. Estos documentos fueron revisados con algoritmos de minería de datos.

Artículo publicado en *Revista de Gestión Pública* (González-Bustamante et al., 2020),  código en  en  GitHub (bajo embargo hasta mediados de 2022). Preprint en inglés disponible en *SocArXiv* (González-Bustamante et al., 2021).

Proceso de recolección de información



Memory Usage: 243 Kb



Creación del conjunto de datos

Tesseract. Motor para reconocimiento óptico que se comenzó a desarrollar en 1995 en Bristol y desde 2005 está disponible como un código abierto y actualmente es usado por [Google](#) (Smith, 2007).

La aplicación de OCR sigue varias etapas. Primero, se identifican componentes conectados y se anidan los contornos y las líneas de texto. Luego, las líneas se dividen en palabras considerando espacios. Cada palabra se intenta reconocer con diccionarios de datos entrenados (*baseline*).

Este proceso implica machine learning, por tanto, se realiza una iteración con el fin de reconocer palabras que en una primera instancia no fueron identificadas. Finalmente, se revisan los espaciados difusos.

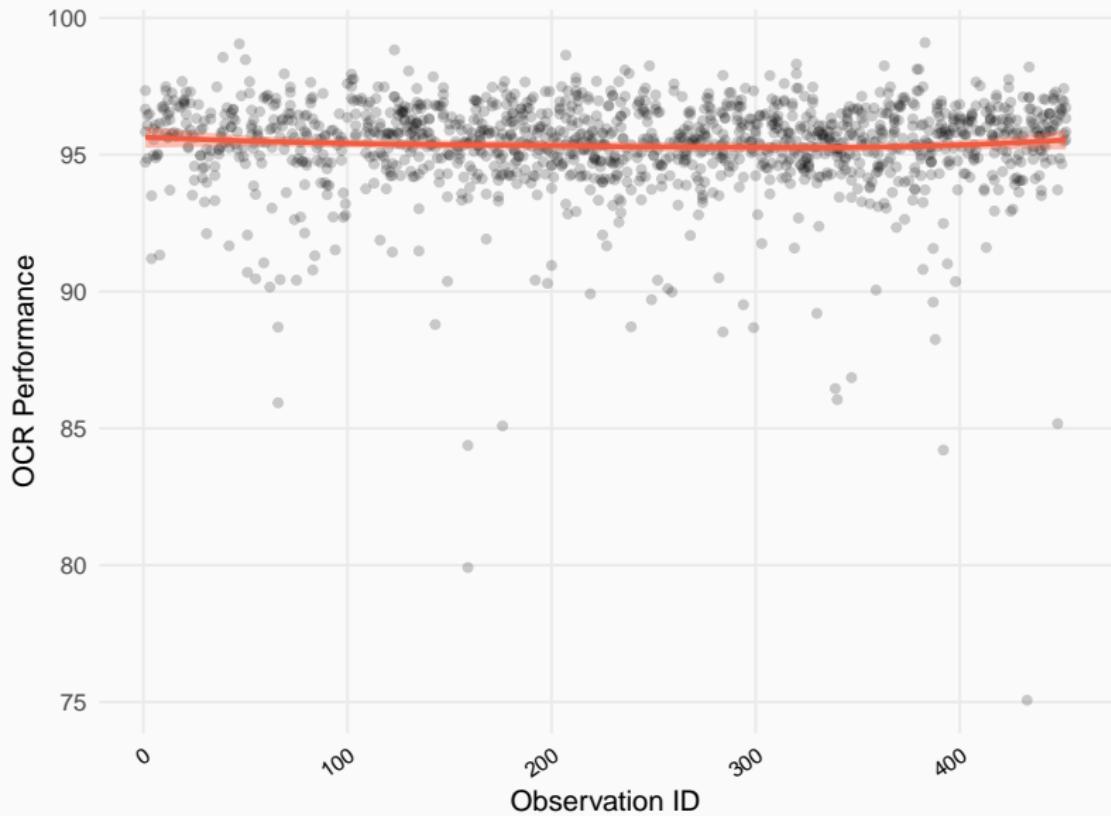
Creación, validación y anonimización

Precisión del algoritmo OCR. Se evaluó la proporción de texto que logró identificar correctamente. Se contrastan las palabras identificadas con diccionarios del idioma usados para entrenar los modelos Long Short Term Memory (LSTM) usados por Tesseract.

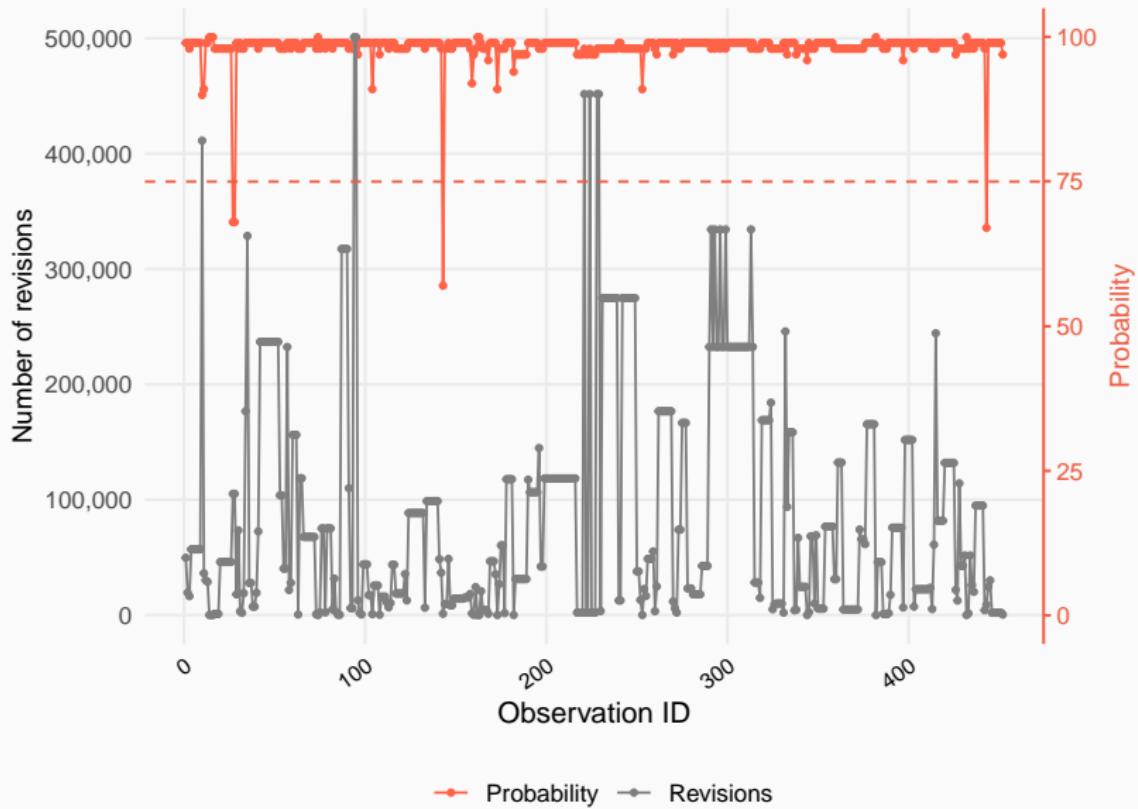
Validación automática de sexo. Usando el primer nombre de cada caso y una base de datos de nombres de diversos países del mundo, sexo y su predicción estimada creada por Casper Strömgren en 2013 ([Wais, 2016](#)). Esta base crece diariamente con datos extraídos de perfiles de redes sociales y en el momento de la revisión contaba con 111.541.298 observaciones, de las cuales 210.959 (0,19 %) correspondían a casos de Chile.

Algoritmo criptográfico. Las variables que contienen información personal fueron anonimizadas en la versión final del conjunto de datos con Secure Hash Algorithm de 256 caracteres (SHA256) basado en una función *hash* que bloquea la ingeniería-reversa ([Shinder y Cross, 2008](#)).

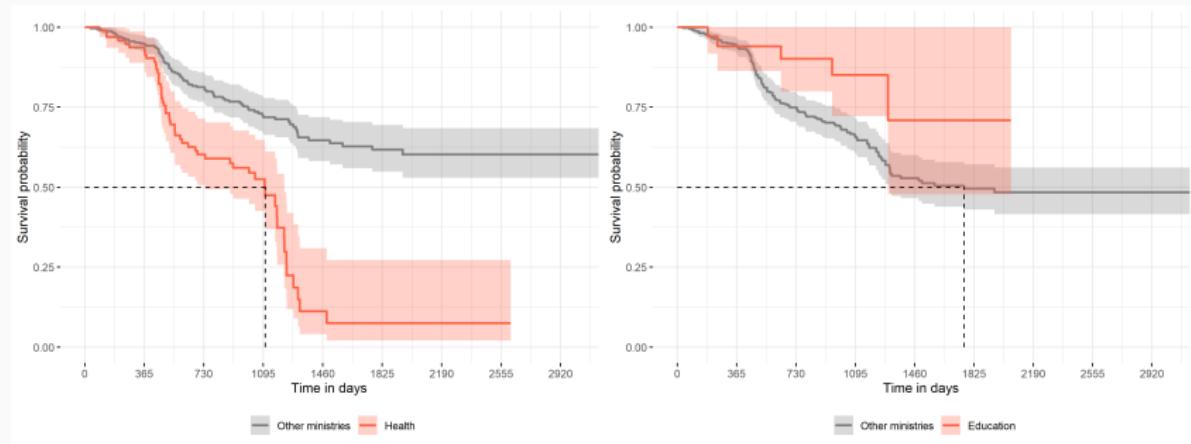
Desempeño y precisión del algoritmo OCR



Validación de la variable sexo



Curvas Kaplan-Meier para altos directivos públicos



Fuente: Elaboración con base en González-Bustamante et al. (2020).

NLP para eventos en América Latina

Revisión automatizada de reportes de prensa

Lote	Archivos	Años	Formato	Tamaño
Lote 01	LAWR-1975 a LAWR-1979 Incluyendo 1997	5	CSV UTF-8	9,56 MB
Lote 02	LAWR-1980 a LAWR-1998 Excluyendo 1997 Incluyendo primera mitad de 2003	18,5	Imágenes PNG	38,5 GB
Lote 03	LAWR-1999 a LAWR-2021 Excluyendo primera mitad de 2003	22,5	Archivos PDF	337 MB

Nota: Revisión de 12 países de América Latina gracias a St Hilda's College Muriel Wise Fund.

Fuente: Elaboración con base en [González-Bustamante \(2021a\)](#).

Detalles logísticos: Documentación/Metadata

 Repositorio permanente con un **Digital Object Identifier (DOI)**, aunque existe período de embargo (dos años).

Data Management Plan (DMP) registrado con detalles y procedimientos técnicos.

Control de versiones Git conectado con  **Open Science Framework (OSF)** con DOI permanente para asegurar replicabilidad de todo el  código programado cuando se libere, información de los paquetes utilizados y las versiones de  y Python.

Detalles logísticos: Almacenamiento

Repositorios de trabajo alojados de forma privada con control de versiones en  GitHub. Acceso es controlado con autentificación criptográfica con  **two-factor authentication (2FA)** con dispositivos físicos de seguridad USB que emiten **one-time passwords** para generar una autentificación criptográfica basada en protocolos Fast IDentity Online (FIDO) 2 y Universal 2nd Factor (U2F).

Respaldados en  **Hierarchical File Server (HFS)** para su recuperación en casos de incidentes no previstos, también controlado con  2FA. Estos archivos de seguridad se encuentran en un hub encriptado con un cifrado 256-bit AES, por tanto, soporta el almacenamiento de información pública, datos institucionales internos e información confidencial.

Respaldo automático diario, mantenimiento ligero semanal y profundo cada 28 días. Procedimiento programado hasta mayo de 2024.

Detalles logísticos: Accesos y seguridad

El etiquetado de datos para el entrenamiento de algoritmos de machine learning se realiza en una  **plataforma en línea** conectada con los repositorios con información en formato JavaScript Object Notation (JSON).

La plataforma de etiquetado cuenta con **protección de HIPPA** y además cumple con California Consumer Privacy Act (CCPA) y General Data Protection Regulation (GDPR).

El acceso de los codificadores es restringido mediante  contraseñas seguras solo a tareas de etiquetado y al terminar el proceso sus credenciales fueron revocadas inmediatamente.

Detalles logísticos: Almacenamiento de largo plazo

La base de datos final y su documentación serán depositados en el  repositorio digital de **Bodleian Libraries** de University of Oxford.

El código programado será liberado y se incorporará al  **GitHub Archive Program**. Como parte de este programa a comienzos de 2020 instantáneas físicas con códigos públicos fueron archivados en película endurecida (1.000 años de duración) y depositados en  **GitHub Artic Code Vault** en una mina de carbón clausurada en una montaña en Noruega. Este procedimiento se repetirá cada cierto tiempo.

Detalles logísticos: Liberación de datos

El acceso a los archivos de LAWR se realizó a través de distintas suscripciones institucionales como se mencionó previamente, por tanto, estos datos no serán liberados y se almacenan con altos estándares de seguridad.

La información elaborada con algoritmos de OCR y machine learning, los datos y su documentación serán liberados en octubre de 2023 para su reutilización bajo una licencia **Creative Commons Attribution 4.0 International (cc BY 4.0)**.

Esta licencia de acceso abierto permite compartir, reutilizar y readaptar los datos sin restricciones adicionales siempre y cuándo se otorgue el reconocimiento apropiado.

Algoritmos de binarización de imágenes

POSTSCRIPT					
POLITICS		PERUVIAN VIOLENCE			
		Death no.	Ch.	Subs.	Arrestos
INCAICAOAN CABINET*		1987	106	166	165
Foreign affairs: Ernesto Leal*		1988	269	1,036	667
Finance: Emilio Pernas		1989	348	1,456	1,251
Economy and development: Julio Cordero		1990	258	1,594	68
Central bank: Silvio de Freitas		1991	335	1,216	1,519
Attorney general: Guillermo Vargas Sandoval		Total	5,736	5,762	5,162
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"New appointment: (last column WR-90-16)					
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Monthly average in administration of:					
Fernando Belaúnde					130
Alan García					156
Albert Fujimori					257
Source: Defense ministry and senate.					
ECONOMY					
INCAICAOAN CABINET*					
On 7 January President César Salinas de Gortari assumed office. He has known three months in advance that his replacement was being planned on the life of former Allende minister, Guillermo Vargas Sandoval.					
BRASILIAN OIL					
Investments	US\$bn				
1987	1.4				
1988	2.90				
1989	4.40				
1990	5.60				
1991	6.00				
Total	18.90				
TRADE					
COLOMBIAN OIL					
Exports	US\$bn				
1987	1.4				
1988	1.9				
1989	1.205				
1990	4.15				
1991	1.60				
Refining Targets	mlpd				
1990	450,000				
1991	200,000				
Source: Energy and mines ministry					
BRAZIL					
Coronavirus					
General Minister Correa has got embroiled in a row with Venezuelan President Daniel Ortega. He claims public subsidy that Pérez, through the Venezuelan oil company, had known three months in advance that his replacement was being planned on the life of former Allende minister, Guillermo Vargas Sandoval.					
AGRICULTURE: Eugenio Pérez					
Environmental affairs and renewable natural resources: Guillermo Pérez					
Commerce Final					
1990 Jan 1990					
1991 Jul 1991					
Source: Banco Central					
CHILEAN BALANCE					
1989	1990	1991	1991		
Exports	7,902	8,293	8,370	8,902	
Imports	4,833	6,502	7,037	7,419	
Balance	2,219	1,578	1,273	1,483	
Source: Banco Central					
CHILEAN BALANCE					
1989	1990	1991	1991		
Exports	7,902	8,293	8,370	8,902	
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REPRINTS: The current series of reports is identified by initial letters for the subject, two numbers for the year and a letter for the issue. Thus in Washington the Weekly Report, 1992, issue number 42, would be identified as WR-92-042. Current reprinting information appears on page 2 of each issue.					
Dated 23 Jan 1992 URGED-05 LATIN AMERICAN WEEKLY REPORT, 1992-1993					
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Algoritmos de binarización de imágenes

POSTSCRIPT						POSTSCRIPT					
POLITICS		VENEZUELAN CABINET*		PERUVIAN VIOLENCE		POLITICS		VENEZUELAN CABINET*		PERUVIAN VIOLENCE	
FINANCE: Pedro Rosales ¹ Foreign affairs: Ernesto León ² Planning and development: Julio Cordero ³ Central bank: Silve rio Pérez ⁴ Agriculture: Roberto Ronconi ⁵ Transport and communications: Jaime Isidrota ⁶ Health: Ernesto Salmerón Labour: Francisco Rosales ⁷ Central bank: Silve rio Pérez ⁸ Attorney general: Guillermo Vargas Sandoval ⁹ <i>*Sworn in by President Vicente Chávez</i> <i>†New appointment:</i> <i>(last column W/H-90-16)</i>	FINANCE: Pedro Rosales ¹ Foreign affairs: Ernesto León ² Planning and development: Julio Cordero ³ Central bank: Silve rio Pérez ⁴ Agriculture: Roberto Ronconi ⁵ Transport and communications: Jaime Isidrota ⁶ Health: Ernesto Salmerón Labour: Francisco Rosales ⁷ Central bank: Silve rio Pérez ⁸ Attorney general: Guillermo Vargas Sandoval ⁹ <i>*Sworn in by President Vicente Chávez</i> <i>†New appointment:</i> <i>(last column W/H-90-16)</i>	MIL 1987 1988 1989 1990 1991 Total	Chv 126 269 348 258 335 7,261	Subs 1,056 1,036 1,456 1,594 1,216 5,762	Narcos 667 667 1,251 1,489 1,519 3,162	Total 8,917 1,996 3,198 3,452 3,290 12,533	MIL 1987 1988 1989 1990 1991 Total	Chv 126 269 348 258 335 7,261	Subs 1,056 1,036 1,456 1,594 1,216 5,762	Narcos 667 667 1,251 1,489 1,519 3,162	Total 8,917 1,996 3,198 3,452 3,290 12,533
Monthly average in administration of: Fernando Belandira Alfonso García Justice Alfredo Duchamet Tadeo Víctor Gamboa ¹⁰ Information: Andrés Eloy Blanco Hurtado ¹¹ Minister of General Fernando Ochoa Aréchiga ¹² Rómulo Miguel Rodríguez ¹³ Development: Inésita Carrasco ¹⁴ Energy and mines: Celestino Arias ¹⁵ Barrios Diaz ¹⁶ Water reform: Celso Corporación Andina de Investigaciones CAVI ¹⁷ Luis Gómez Suárez Figueroa ¹⁸ Fondo de Inversión de Venezuela (FIV): Héctor Tomeo ¹⁹ Delsi Carlos Hernández Díaz ²⁰ Secretary of the presidency: Serafín Gutiérrez ²¹ Agriculture: Eugenio Arias ²² Environmental affairs and mininatural resources: Carmen Lúcia Barreto ²³ Comercies Finol ²⁴ Exports: US\$bns 1987 1988 1989 1990 1991 Total	Monthly average in administration of: Fernando Belandira Alfonso García Justice Alfredo Duchamet Tadeo Víctor Gamboa ¹⁰ Information: Andrés Eloy Blanco Hurtado ¹¹ Minister of General Fernando Ochoa Aréchiga ¹² Rómulo Miguel Rodríguez ¹³ Development: Inésita Carrasco ¹⁴ Energy and mines: Celestino Arias ¹⁵ Barrios Diaz ¹⁶ Water reform: Celso Corporación Andina de Investigaciones CAVI ¹⁷ Luis Gómez Suárez Figueroa ¹⁸ Fondo de Inversión de Venezuela (FIV): Héctor Tomeo ¹⁹ Delsi Carlos Hernández Díaz ²⁰ Secretary of the presidency: Serafín Gutiérrez ²¹ Agriculture: Eugenio Arias ²² Environmental affairs and mininatural resources: Carmen Lúcia Barreto ²³ Comercies Finol ²⁴ Exports: US\$bns 1987 1988 1989 1990 1991 Total	126 269 348 258 335 7,261	1,056 1,036 1,456 1,594 1,216 5,762	667 667 1,251 1,489 1,519 3,162	8,917 1,996 3,198 3,452 3,290 12,533	126 269 348 258 335 7,261	1,056 1,036 1,456 1,594 1,216 5,762	667 667 1,251 1,489 1,519 3,162	8,917 1,996 3,198 3,452 3,290 12,533		
Source: Defense ministry and senate.	Source: Defense ministry and senate.	Source: Defense ministry and senate.	Source: Defense ministry and senate.	Source: Defense ministry and senate.	Source: Defense ministry and senate.	Source: Defense ministry and senate.	Source: Defense ministry and senate.	Source: Defense ministry and senate.	Source: Defense ministry and senate.	Source: Defense ministry and senate.	Source: Defense ministry and senate.
ECONOMY						ECONOMY					
BRAZILIAN OIL		BRAZILIAN OIL		BRAZILIAN OIL		TRADE		BRAZILIAN OIL		TRADE	
Investments	US\$bns	Investments	US\$bns	Investments	US\$bns	Exports	US\$bns	Exports	US\$bns	Exports	US\$bns
1987 1988 1989 1990 1991 Total	1.21 1.99 4.40 5.60 6.00 38.90	1987 1988 1989 1990 1991 Total	1.21 1.99 4.40 5.60 6.00 38.90	1987 1988 1989 1990 1991 Total	1.21 1.99 4.40 5.60 6.00 38.90	Refineries 1987 1988 1989 1990 1991 Total	1.4 1.9 4.4 5.6 6.0 38.90	Refineries 1987 1988 1989 1990 1991 Total	1.4 1.9 4.4 5.6 6.0 38.90	Refineries 1987 1988 1989 1990 1991 Total	1.4 1.9 4.4 5.6 6.0 38.90
Source: Energy and mines Brazil	Source: Petrobras	Source: Energy and mines Brazil	Source: Petrobras	Source: Energy and mines Brazil	Source: Petrobras	Source: Energy and mines Brazil	Source: Petrobras	Source: Energy and mines Brazil	Source: Petrobras	Source: Energy and mines Brazil	Source: Petrobras
CHILEAN BALANCE						CHILEAN BALANCE					
Exports: US\$bns	1988 1989 1990 1991 1992 Total	Imports: US\$bns	1988 1989 1990 1991 1992 Total	Trade balance: US\$bns	1988 1989 1990 1991 1992 Total	Exports: US\$bns	1988 1989 1990 1991 1992 Total	Imports: US\$bns	1988 1989 1990 1991 1992 Total	Trade balance: US\$bns	1988 1989 1990 1991 1992 Total
Exports: US\$bns	7,902 8,293 8,370 8,370 8,370 41,862	Imports: US\$bns	4,833 5,602 7,037 7,419 7,419 32,903	Trade balance: US\$bns	3,069 2,691 1,333 -372 -372 -18,960	Exports: US\$bns	7,902 8,293 8,370 8,370 8,370 41,862	Imports: US\$bns	4,833 5,602 7,037 7,419 7,419 32,903	Trade balance: US\$bns	3,069 2,691 1,333 -372 -372 -18,960
Source: Banco Central	Source: Banco Central	Source: Banco Central	Source: Banco Central	Source: Banco Central	Source: Banco Central	Source: Banco Central	Source: Banco Central	Source: Banco Central	Source: Banco Central	Source: Banco Central	Source: Banco Central
Source: Latin American Weekly Report, 1992, issue number 10, dated 27 June 1991	Source: Latin American Weekly Report, 1992, issue number 10, dated 27 June 1991	Source: Latin American Weekly Report, 1992, issue number 10, dated 27 June 1991	Source: Latin American Weekly Report, 1992, issue number 10, dated 27 June 1991	Source: Latin American Weekly Report, 1992, issue number 10, dated 27 June 1991	Source: Latin American Weekly Report, 1992, issue number 10, dated 27 June 1991	Source: Latin American Weekly Report, 1992, issue number 10, dated 27 June 1991	Source: Latin American Weekly Report, 1992, issue number 10, dated 27 June 1991	Source: Latin American Weekly Report, 1992, issue number 10, dated 27 June 1991	Source: Latin American Weekly Report, 1992, issue number 10, dated 27 June 1991	Source: Latin American Weekly Report, 1992, issue number 10, dated 27 June 1991	Source: Latin American Weekly Report, 1992, issue number 10, dated 27 June 1991

Nota: Página pre-binariazación y luego del algoritmo de Singh et al. (2011).

LATIN AMERICAN WEEKLY REPORT is published weekly (52 issues a year) by Latin American Newsletters, 41 Old Street, London EC1V 9EW, England. Telephone 071 251 0012. Fax 071 253 6193. EDITOR: EDUARDO CRAWLEY. Latin American Newsletters (Journals), 1000 Avenue of the Americas, New York, NY 10036, U.S.A. and 100, rue de la Convention, 75015 Paris, France. The Southern Cone (RS), Latin American Economy & Business (LAE&B); Special Reports (SR); Informes Especiales (IE); Informe Latinoamericano (IL); As 101 (1988-1992); As 102 (1993-1994); As 103 (1995-1996); As 104 (1997-1998); As 105 (1999-2000); As 106 (2001-2002); As 107 (2003-2004); As 108 (2005-2006); As 109 (2007-2008); As 110 (2009-2010); As 111 (2011-2012); As 112 (2013-2014); As 113 (2015-2016); As 114 (2017-2018); As 115 (2019-2020); As 116 (2021-2022). Sandford Park Trading Estate, Copse Street, Chelmsford, Essex CM2 0EP. ©1992-2002 Copyright © in all countries. All rights reserved. No part of the journal may be reproduced, stored in any retrieval system or transmitted, in whole or in part, without permission of the publishers. Registered as a newspaper at the Post Office, London. All rights reserved. Any person who does any unauthorised act in relation to this publication may commit a criminal offence. No part of this publication may be reproduced, stored in any retrieval system or transmitted, in whole or in part, without the written permission of the publishers. Registered as a newspaper at the Post Office, London. ISSN 0826-2492. The current series of reports is identified by initial letters for the reports, two numbers for the year and a letter (a) or (b) after the year. Thus the Weekly Report is the Weekly Report, 1992, issue number 4.

Algoritmos de binarización de imágenes

POSTSCRIPT		POSTSCRIPT																													
POLITICS		PERUVIAN VIOLENCE																													
VENEZUELAN CABINET		PERUVIAN VIOLENCE																													
Finance: Pedro Rosales ¹ Foreign affairs: Ernesto Leal ² Transport and communications: Emilio Pérez Economy and development: Julio Díaz External co-operation: Erwin Kruger Health: Carlos Hunedo President: Antonio Lacerda Agriculture: Humberto Bell Transport: Rodolfo Ronón Planning and construction: Jaime Iacobacci Health: Ernesto Schermer Labour: José Francisco Rosales Central bank: Silvio de Pádua Attorney general: Gustavo Vargas Sandino		<table border="1"> <thead> <tr> <th>Death inf.</th> <th>M.L.</th> <th>States</th> <th>Narcos</th> </tr> </thead> <tbody> <tr> <td>1987</td><td>126</td><td>366</td><td>165</td> </tr> <tr> <td>1988</td><td>289</td><td>1,030</td><td>687</td> </tr> <tr> <td>1989</td><td>348</td><td>1,450</td><td>1,251</td> </tr> <tr> <td>1990</td><td>258</td><td>1,547</td><td>68</td> </tr> <tr> <td>1991</td><td>335</td><td>1,516</td><td>1,516</td> </tr> <tr> <td>Total</td><td>1,736</td><td>5,182</td><td>257</td> </tr> </tbody> </table> <p>Monthly average in administration of: Fernando Bautista 130 Alan García 156 Alberto Fujimori 252</p>		Death inf.	M.L.	States	Narcos	1987	126	366	165	1988	289	1,030	687	1989	348	1,450	1,251	1990	258	1,547	68	1991	335	1,516	1,516	Total	1,736	5,182	257
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Source: Defence ministry and seruds																															
PERUAN VIOLENCE		PERUAN VIOLENCE																													
Finance: Pedro Rosales ¹ Interior: Víctor Avila Transport and communications: Fernando Martínez ² Family: Matheus Ledezma ¹ Health: Luis Gómez Urban development: Julio Díaz Dodgeball: Díogenes Muñoz Transport: Antonio Ledezma ¹ Labour: Jésus Rubén Lacerda ² Justice: Alfredo Duque ¹ Duchamet: Tomás Víctor Gamboa ² Information: Andrés Eloy Blanco ¹ Agriculture: Germán Ochoa Arribalzaga ² Planning and budget: Fernando Martínez ¹ Development: Inéska Alvarado ¹ Energy and mines: Cesarino Arias ¹ Transport: Gustavo Rosales ¹ Women's affairs: Cecilia García Prado ¹ Science and technology: Dulce Amaro de Urdozaga ¹ Labour: José Antonio Abreu ¹ Health: Ernesto Schermer ¹ Transport: Carlos Beltrán ¹ Corporación Andina de Fomento (CAF): César Léspido Suárez Figueroa ¹ Fondo de Inversión de la Familia (FIF): Héctor Torres ¹ Def.: Carlos Hernández ¹ Secretary of the presidency: Beatrice Sánchez ¹ Agriculture: Eugenio Sánchez ¹ Environmental affairs and renewable natural resources: Ricardo Colomares Frind ¹		<table border="1"> <thead> <tr> <th>Death inf.</th> <th>M.L.</th> <th>States</th> <th>Narcos</th> </tr> </thead> <tbody> <tr> <td>1987</td><td>106</td><td>366</td><td>165</td> </tr> <tr> <td>1988</td><td>289</td><td>1,030</td><td>687</td> </tr> <tr> <td>1989</td><td>348</td><td>1,450</td><td>125</td> </tr> <tr> <td>1990</td><td>258</td><td>1,584</td><td>1,543</td> </tr> <tr> <td>1991</td><td>335</td><td>1,310</td><td>151</td> </tr> <tr> <td>Total</td><td>1,736</td><td>5,182</td><td>257</td> </tr> </tbody> </table> <p>Monthly average in administration of: Fernando Bautista 130 Alan García 156 Alberto Fujimori 252</p>		Death inf.	M.L.	States	Narcos	1987	106	366	165	1988	289	1,030	687	1989	348	1,450	125	1990	258	1,584	1,543	1991	335	1,310	151	Total	1,736	5,182	257
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Source: Defence ministry and seruds																															
ECONOMY		ECONOMY																													
BRAZILIAN OIL		BRAZILIAN OIL																													
Investments:		Investments:																													
1991		US\$bn																													
Exports		1.53																													
Imports		2.90																													
Refineries		4.40																													
Deficit fuel		5.82																													
1990		5.82																													
1991		6.00																													
Total		18.97																													
Source: USDOE																															
COLOMBIAN OIL		COLOMBIAN OIL																													
Exports:		US\$bn																													
1991		1.4																													
1990		1.5																													
1991		1.5																													
1990		1.5																													
1991		1.5																													
Refineries:		1.21																													
Deficit fuel:		1,205																													
1991 upgrade:		415																													
REFINING TARGETS		mhpd																													
Production:		450,000																													
Exports:		200,000																													
Source: Energy and mines ministry																															
CHILEAN BALANCE		CHILEAN BALANCE																													
1990		US\$bn																													
Exports		1,869																													
Imports		9,083																													
Balance		-7,214																													
1991		US\$bn																													
Exports		1,990																													
Imports		8,310																													
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Imports		8,310																													
Balance		-6,320																													
2028		US\$bn																													
Exports		1,990																													
Imports		8,310																													
Balance																															

Nota: Página pre-binariación y luego del algoritmo de Su et al. (2010).

Módulo de análisis de diseño de Tesseract

Durante la etapa de layout analysis resulta particularmente desafiante detectar ciertos contornos que de tablas y columnas (Shafait y Smith, 2010; Smith, 2009).

Para manejar esta dificultad utilizamos el layout analysis de Tesseract aplica un proceso de **tab-stop detection** de varios pasos que permite identificar columnas y luego segmentar los párrafos del texto en bloques.

El algoritmo se aplica sobre el segundo y tercer lote de archivos, lo que implica aplicar el algoritmo sobre archivos de 41 años. Tanto imágenes escaneadas en formato PNG como los documentos en PDF se convierten en texto plano en formato Unicode (TXT UTF-8) que luego se convierte a CSV UTF-8.

Módulo de análisis de diseño de Tesseract

The logo for the Latin American weekly report. It features a black and white striped border at the top. Inside, the word "Latin" is written vertically on the left side of a diagonal line, and "American" is written vertically on the right side. Below this, the words "weekly report" are written in a large, bold, sans-serif font. In the bottom right corner, there is a stylized graphic of a postmark with the text "GENERAL POSTAL SERVICE" and "BOSTON MASSACHUSETTS".

How Domingo Cavallo rose to become Menem's virtual prime minister

Argentines are still hotly debating what lay behind the sudden resignation of economy minister Antonio Hernán González and his replacement by Domingo Cavallo (WR-91-08). The simple explanation — that the rapid, uncontrolled upside of the dollar rate — is dismissed as sufficient reason, and much has been published about all sorts of political plots.

One thing seems certain: that González had several times waved his resignation at Menem and, according to sources with access to him, that he knew President Carlos Menem would one day accept it. Indeed, a widely accepted version is that Menem had always intended to appoint Cavallo as his economy minister, to preside over the period of 'activation' which he expected would follow a first phase of 'stabilisation'. In this scenario, all González did was to choose his own timing.

—Another strand of interpretation is that the change took place as Menem suddenly lost his confidence, shaken by a series of events he had not bargained with. The deepest adverse reaction came from the military, who sought to punishment the military leaders of the dirty war of the 1970s; the scandal over widespread corruption in the highest reaches of the government, and the realization that despite his gestures, he could not count on unquestioning support from the Bush administration.

This is at a time when even such highly placed members of his government as Vice-President Eduardo Duhalde were seeking as many ways as possible to emphasize Menem's departure from the presidency (for weeks speculation has been rife about which of the many constitutional succession procedures would most favour).

It was at this point, the scenario goes, that Cavallo bolstered Menem's resolve to hang on. As it result, Cavallo has emerged not only as the new economy minister, but also as a virtual vice-president, able to oversee the share-out of his ministerial posts and even to appoint his own people in other ministries. Cavallo, it is said, has replaced even Senator Eduardo Menem, the President's brother, as Carlos Menem's most trusted adviser.

Many expect Cavallo to push for an agreement with the main opposition party, Raúl Alfonsín's Union Civilta (UCR), on some aspects of his economic plan to ensure the continuity of the government. This is an option that many prominent politicians and businessmen, and even US diplomats, have been exploring since late 1990. ■

Argentines are still holding what lay behind the sudden resignation of economy minister Ernesto González y González, as reported by Domingo Cavallo (B). The reason, he said, was unanticipated upward pressure on the dollar rate — a dismaying, albeit innocent, reason, and much more plausible than all sorts of plots.

One thing seems clear: González had several reasons for his resignation at Menem's insistence, according to sources with knowledge of him, that he knew President Menem would one day insist, indeed, a widely accepted view. Menem had always sought to expand Argentina's autonomy, to provide over the long term a "soft deactivation" which would allow the peso to follow a first phase inflation. In this scenario, all he was to choose his own

debating in resigning from Antioquia (WRI-VR, 1991).¹ This was as sufficient as political autonomy, that he could accept it, and, according to Carlos González, he accepted it. The version is intended to be understood as a kind of expected or expected of stability, González, Hirmer, and others.

Another strand of interpretation suggests that Menem suddenly lost confidence, shaken by an events he had not been able to control, and turned towards the decision of the military leaders of the 1990s, the state widespread corruption in reaches of the government realization that, despite this could not count on sufficient support from administrative.

This, at a time when highly placed members of government Vice-President, and ministers were open an atmosphere of manoeuvring in the presidency (for weeks as has been noted above, many constitutional issues procedures would find more

It was at this point, the scenario continues, that Cavalllo, bolstered by Menem's resolve to hang on, as a result, Cavalllo became the economy minister, but as a virtual prime minister – able to organise the share-out of key ministries posts and even to nominate his own ministers. Cavalllo, it is said, has replaced even Senator Eduardo Menem, the President's brother, as Carlos Menem's most trusted adviser.

Many expect Cavalllo to push forward an agreement with the men behind the coup, the Armed Forces Union and the Civic Radical (JCR), on some form of coalition that would ensure the continuity of the government. The military, the political parties, the politicians and businessmen, and even US diplomats, have been exploring since late 1990 ■

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EQUADOR: 'Holiday' cholera outbreak

COLOMBIA: Prospects of links abroad with CMO

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budget re-think, (3)
A Soviet partner
in scheme? (3)

Watch out for the
HT-1000's 16/12

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EL SALVADOR: Se as FMLN 'breaches secrecy'. (10 / 11)
COSTA RICA: P

PANAMA: Time to
Nicaragua officers?

11

ECUADOR: 'Holmes' cholera outbreak

COLOMBIA: Priorities ahead

IN

VENEZUELA: Lower prices force budget re-think. (3)
BOLIVIA: A Soviet partner for Lithium scheme? (3)

~~on democracy, H)~~

11

~~Few friends for
Hector H. (B-5)
proposal to extend
mandate of~~

~~Latitude faces first challenges~~

Nota: Aplicación de líneas tab-stop y estructura de columnas.

Módulo de análisis de diseño de Tesseract

The image shows a newspaper clipping from the 'Latin American weekly report'. At the top right, there is a red box containing the text 'Year and Week'. Below it, the word 'Headline' is written in red. In the center, the headline reads: 'How Domingo Cavallo rose to become Menem's virtual prime minister'. The text of the article is divided into several paragraphs, with the first one being highlighted by a red box. At the bottom, there is a section titled 'INSIDE' followed by a list of international news briefs.

Year and Week

Headline

How Domingo Cavallo rose to become Menem's virtual prime minister

Argentines are still hotly debating what lay behind the sudden resignation of economy minister Antonio Ercole González and his replacement by Domingo Cavallo (WR 91-08). The simple explanation—the rapid uncontrollable upsurge of the dollar—cannot be all there is to it. There is a decent reason, and much has been published about all sorts of political plots.

One thing seems certain: that González had several times waved his resignation at Menem—and, according to sources with access to him, that he knew President Carlos Menem was one day going to accept it. Indeed, a widely accepted version is that Menem had always intended to appoint Cavallo as his economic manager. The reason was that the 'activation' which he expected would follow a first phase of 'stabilisation'. In this scenario, all González did was to choose his own timing.

Another strand of interpretation is that the change took place as Menem suddenly lost his confidence in the man he had chosen. It events he had not bargained with. The depth of adverse popular feeling towards his decision to pardon the leaders of the military coup of the 1970s, the scandal over widespread corruption in the highest reaches of the government, and the realisation that his policies had not won him the unswerving support from the Bush administration.

This is at a time when even such high-profile members of his government as Vice-President Eduardo Duhalde were seen as joining in the manoeuvring to engineer Menem's replacement. In the presidential race (for weeks speculation has been rife about which of the many constitutional succession procedures would meet favour),

It was at this point, the scenario goes, that Cavallo bolstered Menem's resolve to hang on. As a result, Cavallo became not only as the new economy minister, but as a virtual prime minister—able to organise the share-out of power among the men he chose to appoint his own people in other ministries. Cavallo, it is said, has replaced, even Senator Eduardo Menem, the President's brother, as Carlos Menem's most trusted advisor.

Many expect Cavallo to push for an agreement with the main opposition party, Raúl Alfonsín's Unión Cívica Radical (UCR), on some form of coalition that would ensure Menem's re-election in October. This is an option that many prominent politicians and businessmen, and even US diplomats, have been exploring since late 1990. ■

PERU: Wildfire spread of cholera epidemic. (2)

EQUADOR: 'Holiday' discourses impact on rice. (2)

COLOMBIA: Prospects of life, abroad, with CNG. (3)

VENEZUELA: Lower prices force budget re-think. (3)

BOLIVIA: A Soviet partner for the oil industry. (3)

PARAGUAY: Placing limits on democracy. (4)

REGION: Watch out for the 'Gulf effect', Mexico. (6-7)

BRAZIL: Few friends for Piano Collet II. (8-9)

CHILE: Proposal to extend Ayala's mandate. (9)

EL SALVADOR: Setback as FMLN 'breaches' democracy. (10-11)

COSTA RICA: Preparing a new case. (11)

HAITI: Aristide faces first major challenges. (12)

PANAMA: Time to recall Noriega officers? (11)

Nota: Identificación y segmentación de bloques.

Conjunto de datos dependiente del tiempo

Ministro	Entrada	Salida	Evento	Cuest.	Re-Elección	Legislativo
1	0	30	0	0	1	3
1	30	60	0	0	1	3
1	60	80	0	1	1	4
2	0	15	0	0	1	3
2	15	30	1	1	1	3
2	30	60	0	1	1	3
2	60	80	2	2	1	4

Fuente: Elaboración con base en [González-Bustamante \(2020, 2021a\)](#).

Codificación de datos dependientes del tiempo

Por ejemplo, en [González-Bustamante \(2021b\)](#) fusionamos los conjuntos de datos de ministros de Brasil y Chile entre 1990 y 2014 de [Franz y Codato \(2016\)](#) and [González-Bustamante y Olivares \(2018\)](#).

De esta forma obtenemos un conjunto de **488 observaciones** que codificamos como **dependiente del tiempo** con puntos de corte trimestrales para todo el período con el fin de incorporar la aprobación presidencial y datos macroeconómicos como **time-varying covariates**.

La base se codifica con casos que tienen múltiples observaciones, en este caso i -th ministros, según intervalos de tiempo definidos correspondientes a eventos específicos: los cuatro trimestres de cada año. La varianza de las covariables que varían en el tiempo se codifica sobre el intervalo cerrado.

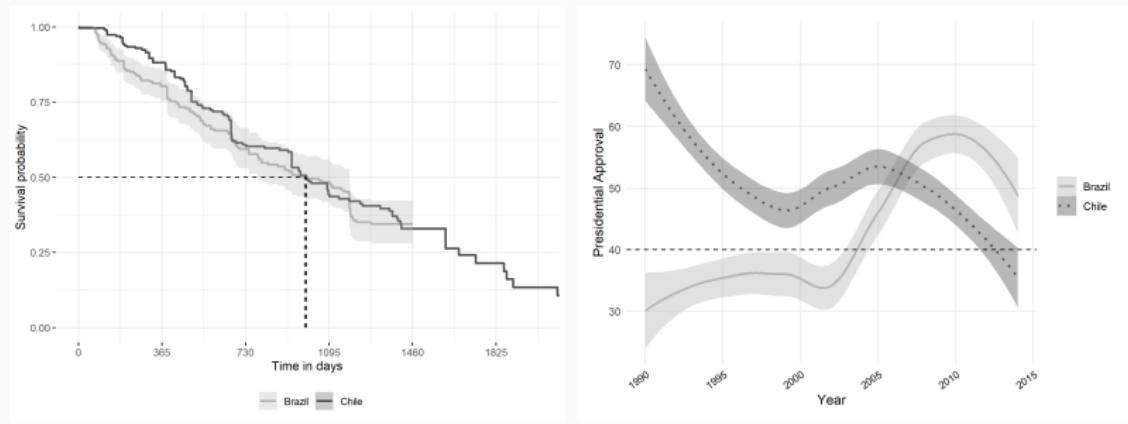
Codificación de datos dependientes del tiempo

El último intervalo de cada caso termina con la salida (u otro *competing risk*) del ministro Y_i , excepto en los casos censurados administrativamente. Fusionamos en cada intervalo $Z(t)$ **quarterly smoothed presidential approval** con datos de [Carlin et al. \(2019\)](#).

Además, agregamos indicadores macroeconómicos de [World Bank \(2020\)](#) (crecimiento e inflación) y el número efectivo de partidos con el indicador de [Gallagher y Mitchell \(2005\)](#) actualizado.

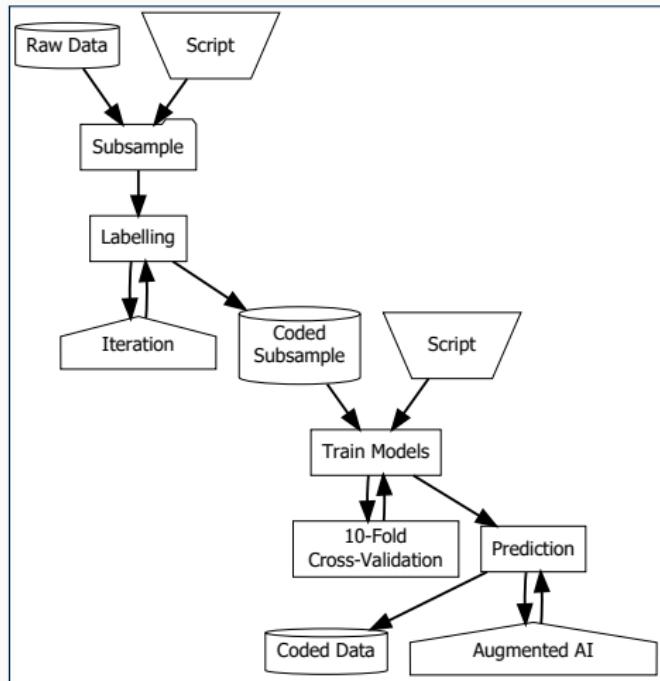
Esto nos permite obtener un conjunto con **4.245 observaciones**.

Estimaciones de supervivencia y aprobación



Fuente: Elaboración con base en [González-Bustamante \(2021b\)](#).

NLP en LAWR y modelos supervisados para identificar crisis



dplyr::**relocate()**
move COLUMNS around!

Default: move to FRONT
or move to
before or after
A SPECIFIED COLUMN!



Indicadores del proceso de etiquetado

Codificador	Etiquetas	$M(T)$ etiqueta	\sum Tiempo	Consenso
1	966	39s	10h 25m	94.05
2	718	1m 15s	15h 0m	94.84
3	704	38s	7h 29m	94.82
4	318	1m 4s	5h 38m	95.47
5	263	17s	1h 14m	99.26
6	101	1m 17s	2h 9m	88.50

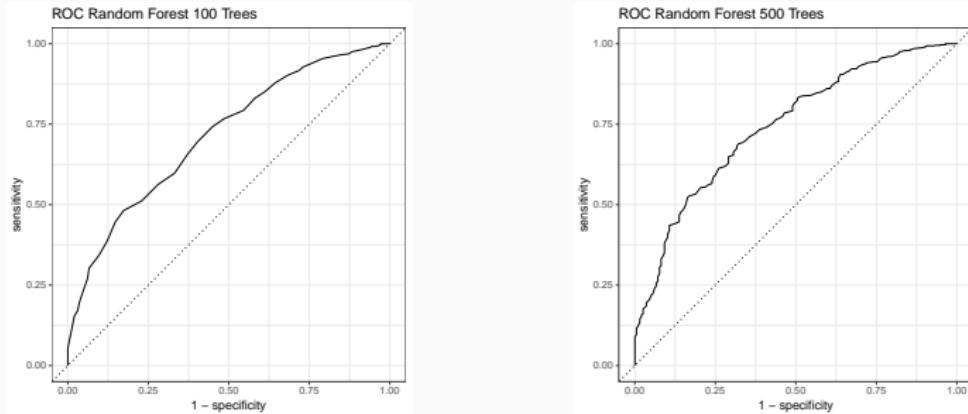
Fuente: Elaboración con base en [González-Bustamante \(2021a\)](#).

Desempeño de los modelos supervisados

Modelo	Exactitud	Precisión	Sensibilidad
Naïve Bayes	0,714	0,803	0,825
SVM Kernel-Lineal	0,658	0,802	0,728
SVM Kernel-Gaussiano	0,756	0,756	0,999
Random Forest (100 árboles)	0,761	0,760	0,998
Random Forest (500 árboles)	0,761	0,760	0,999

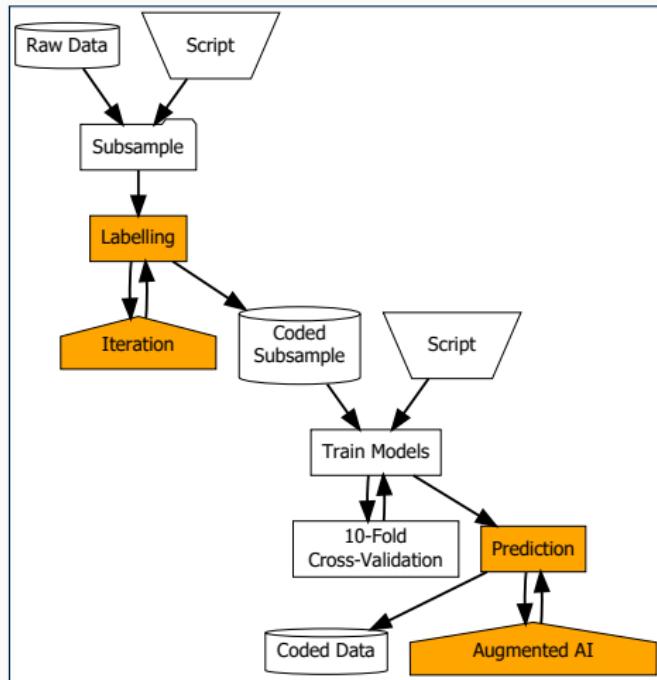
Fuente: Elaboración con base en [González-Bustamante \(2021a\)](#).

Curvas ROC de modelos Random Forest



Fuente: Elaboración con base en [González-Bustamante \(2021a\)](#).

¿Cómo aumentar la capacidad predictiva?



Training Data Lab

Training Data Lab

© 2020 **Training Data Lab** es un grupo de investigación que se enfoca en aplicaciones de ciencia de datos en ciencias sociales en tres áreas interconectadas: **minería de datos, modelamiento econométrico y aprendizaje automático**. Por una parte, buscamos recoger datos con técnicas de minería para elaborar modelos econométricos con técnicas observacionales o de emparejamiento.

Por otro lado, nos enfocamos en entrenar modelos con técnicas de aprendizaje automático y profundo etiquetando conjuntos de datos para diferentes proyectos. Lo anterior, nos permite clasificar datos no codificados usando nuestros modelos entrenados incorporando validación humana en el flujo de trabajo, lo que mejora la inteligencia artificial en los procesos de aprendizaje.



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Algoritmo clasificador para mociones legislativas

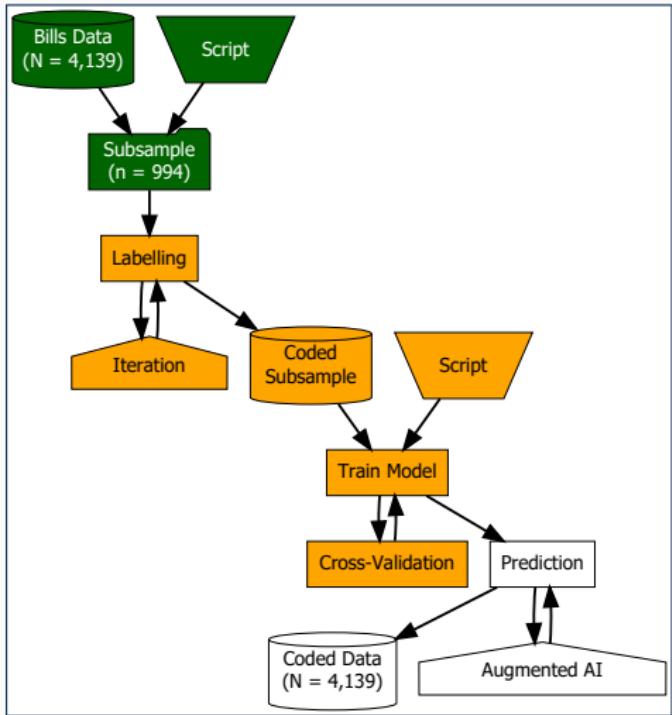
 Bastián González-Bustamante, Carla Cisternas, Diego Aguilar
y Jaquelin Morillo

 training-datalab.com/projects/chilean-congress-bills

Training Data on Chilean Congress Bills. A partir de un conjunto de datos de proyectos de ley de la Cámara de Diputados de Chile entre 2006 y 2018 ($N = 4.139$), período que corresponde a tres administraciones, extraemos una submuestra aleatoria considerando algunos proyectos de ley por mes.

En esta submuestra realizamos dos procedimientos de codificación de datos para identificar tanto el tipo de proyecto de ley como su alcance territorial.

Algoritmo clasificador para mociones legislativas



Proyecto VIP de machine learning



APLICACIONES DE MACHINE LEARNING EN POLÍTICAS PÚBLICAS Y ECONOMÍA

Proyecto VIP de machine learning

-  Carla Cisternas y Francisco Castañeda (responsables)
-  Bastián González-Bustamante, Rodrigo Cuevas y Diego Aguilar
-  training-datalab.com/projects/vip-project-machine-learning

Aplicaciones de Machine Learning en políticas públicas y economía.

Este proyecto VIP busca conformar un equipo multidisciplinario de investigación verticalmente integrado para realizar diferentes aplicaciones de aprendizaje automático en temas de políticas públicas y economía. En esta primera versión, nos centraremos en las dinámicas de desinformación en temas económicos y de interés público.

Posteriormente, en futuras versiones, esperamos abordar y analizar otros fenómenos relacionados con la formulación de políticas públicas sectoriales y regulación de mercados.

Proyecto VIP de machine learning

twConstitution



Twitter Online Tracker of the Chilean Referendum for a New Constitution

[View the Project on GitHub](#)
bgonzalezbustamante/twConstitution

Twitter Online Tracker of the Chilean Referendum for a New Constitution

version v1.2.6 issues 1 open issues 4 closed DOI 10.17605/OSF.IO/73NDB

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This is a Twitter online tracker of the Chilean referendum for a new Constitution in October 2020, which contains daily datasets on **#Apruebo** (see words network, *forthcoming*) and **#Rechazo** (see words network, *forthcoming*) viewpoints on this social media.

Data sets are scraped and uploaded regularly. Some of the variables are date, hour, username, tweet text, RT count, fav count, location, among others. The data was collected during the afternoon each day. A couple of exceptions, such as October 6th and 26th, were collected early morning on the following day. This is not an issue because the data could be sliced, and in order to work with the whole period, it is necessary to merge the sets and retain unique cases.

Dataset	Date	Year	N	Size	Format
#Apruebo	Nov. 01	2020	45,195	46.5 MB	CSV
#Rechazo	Nov. 01	2020	22,142	24.0 MB	CSV
#Apruebo	Oct. 31	2020	50,244	52.1 MB	CSV
#Rechazo	Oct. 31	2020	27,331	29.9 MB	CSV
#Apruebo	Oct. 30	2020	53,889	56.1 MB	CSV
#Rechazo	Oct. 30	2020	33,479	36.6 MB	CSV

Agradecimientos y referencias

Agradecimientos I

Senior Public Managers: A Novel Dataset on Members of the Chilean Civil Service

Agradezco a Matías Astete y Berenice Orvenes, coautores del artículo que además se hicieron cargo principalmente de la validación de información y recolección de fuentes para la aplicación de algoritmos.

Esta investigación fue financiada por la Facultad de Administración y Economía de la Universidad de Santiago de Chile.

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Stability during Presidential Approval Crises in Brazil and Chile

Agradezco a Petra Schleiter, Stephen Whitefield y Moshe Ben Hamo Yeger sus importantes comentarios teóricos y metodológicos. También agradezco a Adriano Codato, Renato Perissinotto, Carla Cisternas y Cristóbal Rovira sus valiosos comentarios versiones preliminares del diseño.

Esta investigación fue financiada por la Agencia Nacional de Investigación y Desarrollo de Chile (ANID/PFCHA/72200340).

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A Political Events Data Set of 12 Latin American Presidential Democracies

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Presentación compilada con **LATEX** y algunos ☕

⌚ Descargar la versión más reciente desde [GitHub](#)

♾ Artwork utilizado disponible en [GitHub](#)

Muchas gracias por su atención

